**3GPP TSG RAN WG1 #110 R1-220xxxx**

**Toulouse, France, August 22nd – 26th, 2022**

**Agenda Item: 8.11**

**Source: Moderator (Apple)**

**Title: Moderator Summary of Reply LS to R1-2207813 (LS on missing RRC parameter in IUC Scheme 2, RAN2)**

**Document for: Discussion and Decision**

# Introduction

RAN2 sent an LS [1] on missing RRC parameter in IUC. In the LS, RAN2 mentioned that RAN2 agreed to add “deltaRSRP-Threshold” in the RRC specification ensure IUC scheme 2 can be correctly implemented in Rel-17.

In this contribution, we discuss the value range of the new RRC parameter “deltaRSRP-Threshold” for the LS from RAN2.

# Discussions

## Background

The following working assumption was made in RAN1 #107e meeting.

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| **Working Assumption**A resource pool level (pre-)configuration can enable one of the following options: * Option 1:
	+ For Condition 2-A-1 of Scheme 2, support following additional criteria to determine resource(s) where expected/potential resource conflict occurs
		- For the case when UE-A is a destination UE of a TB transmitted by UE-B
			* The resource(s) are fully/partially overlapping in time-and-frequency with other UE’s reserved resource(s) whose RSRP measurement is larger than a RSRP threshold according to the priorities included in the SCI:
				+ prio\_TX and prio\_RX are the priorities indicated in the SCI making the overlapping reservations for UE-B and other UE respectively
		- For the case when UE-A is a destination UE of a TB transmitted by another UE
			* The resource(s) are fully/partially overlapping in time-and-frequency with other UE’s reserved resource(s) when RSRP measurement of UE-B’s reserved resource is larger than a RSRP threshold according to the priorities included in the SCI:
				+ prio\_TX and prio\_RX are the priorities indicated in the SCI making the overlapping reservations for other UE and UE-B respectively
* Option 4:
	+ For Condition 2-A-1 of Scheme 2, support following additional criteria to determine resource(s) where expected/potential resource conflict occurs
		- For the case when UE-A is a destination UE of a TB transmitted by UE-B
			* The resource(s) are fully/partially overlapping in time-and-frequency with other UE’s reserved resource(s) whose RSRP measurement is larger than a (pre)configured RSRP threshold compared to the RSRP measurement of UE-B’s reserved resource.
		- For the case when UE-A is a destination UE of a TB transmitted by another UE
			* The resource(s) are fully/partially overlapping in time-and-frequency with other UE’s reserved resource(s) when RSRP measurement of UE-B’s reserved resource is larger than a (pre)configured RSRP threshold compared to the RSRP measurement of the resource(s).
	+ Support of Option 4 is subject to UE capability
* FFS: Whether/how RSRP threshold depends on priority, MCS, overlap
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This working assumption is captured in TS 38.213 as follows:

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| TS38.21316.3.0 UE procedure for transmitting PSFCH with control information\*\*\* < Unchanged parts are omitted> \*\*\*The first UE can be provided conditions by *optionForCondition2A1Scheme2* to determine conflict of reserved resources in a resource pool- if *optionForCondition2A1Scheme2* = 'RSRP-ThresPerPriorities', the first UE can be provided by, *ThresPSSCH-RSRP-List* $Th\left(p\_{i},p\_{j}\right)$, a list of RSRP thresholds for each priority combination $\left(p\_{i},p\_{j}\right)$ [6, TS 38.214]- if the first UE is an intended receiver for PSSCH in a reserved resource of the second UE, the first UE determines a resource conflict if the RSRP [6, TS 38.214] of the third UE is above a threshold$ Th\left(p\_{2},p\_{1}\right)$- if the first UE is an intended receiver for PSSCH in a reserved resource of the third UE, the first UE determines a resource conflict if the RSRP of the second UE is above a threshold$ Th\left(p\_{1},p\_{2}\right)$- if *optionForCondition2A1Scheme2* = 'RSRP-ThresWithRsrpMeasurement', the first UE can be provided a value $Delta\\_Th$ by *deltaRSRPThresh*- if the first UE is an intended receiver for PSSCH in a reserved resource of the second UE, the first UE determines a resource conflict if $RSRP\_{2}>RSRP\_{1}+Delta\\_Th$, where $RSRP\_{1}$ and $RSRP\_{2}$ are the RSRP measurements from the first UE for the second UE and the third UE, respectively- if the first UE is an intended receiver for PSSCH in a reserved resource of the third UE, the first UE determines a resource conflict if $RSRP\_{1}>RSRP\_{2}+Delta\\_Th$\*\*\* < Unchanged parts are omitted> \*\*\* |

The high layer parameter *deltaRSRP-Thresh* has not been defined in RAN2 specifications TS 38.331, due to the lack of this parameter in RRC parameters for sidelink enhancement provided from RAN1 to RAN2.

## Round 1 discussion

In NR sidelink, RSRP threshold (e.g., the IE *SL-Thres-RSRP-List*) is defined in the unit of dBm. The parameter *deltaRSRP-Thresh* is the metric for the difference between two RSRP measurements. Hence, to take advantage of the convenience of using logarithmic unit, it is moderator’s understanding that the unit of *deltaRSRP-Thresh* is dB. With this understanding, the inequality such as $RSRP\_{2}>RSRP\_{1}+Delta\\_Th$ in TS 38.213 are presented as logarithmic addition.

*Question 1: Do you agree that the unit of deltaRSRP-Thresh is dB?*

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| Company | Answer to Question 1 | Comments |
| OPPO | Yes |  |
| DCM | Yes |  |
| vivo | Yes |  |
| Intel | Yes |  |
| Xiaomi | Yes |  |
| Qualcomm | Yes |  |
| Samsung | Yes |  |
| Nokia, NSB | Yes |  |
| ZTE,Sanechips | Yes |  |
| NEC | Yes  |  |
| CATT, GOHIGH | Yes |  |

The IE *SL-Thres-RSRP* is of integer 0 to 66 to indicate the sidelink RSRP threshold, where value 0 corresponds minus infinity dBm, value 66 corresponds infinity dBm, and the other value n corresponds to (-128+(n-1)\*2) dBm.

The parameter *deltaRSRPThresh* is for the difference of two RSRP measurements. Companies are welcomed to share their views on the value range of *deltaRSRP-Thresh.* Some possible options are listed below.

*Question 2: What is the value range of deltaRSRP-Thresh?*

*Alt 1: always positive plus 0*

*Alt 2: always negative plus 0*

*Alt 3: either positive or negative*

*Alt 4: other (please describe)*

*For each alternative, please share the maximum value and/or minimum value.*

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| Company | Answer to Question 2 | Comments |
| OPPO | Alt 1 | “larger than” in the agreement suggests that the threshold should be *positive plus 0*. |
| DCM | Alt 3 | Even if power of signal being interference is a bit smaller than that of interfered signal, it should be possible to assume that it is conflict. |
| vivo | Alt 3 | Either 1/2/3 is OK. Alt 3 seems to be flexible and can cover both Alt 1 and Alt 2. |
| Intel | Alt 1 |  |
| Xiaomi | Alt 3 | Alt 3 is more flexible than others. |
| Qualcomm | Alt 1 |  |
| Samsung | Alt3 | Value 0 should not be mapped to minus infinity and value 66 should not be mapped to infinity |
| Nokia, NSB | Alt 3 | More flexible |
| ZTE,Sanechips | Alt 3 | The maximum for deltaRSRP-Thres can be 10dB, approximately 15% of the maximum value for sidelink RSRP threshold. |
| NEC | Alt 1 | [] |
| CATT, GOHIGH | Alt.4, the value range could be both positive and negative plus 0 | From our understanding, the deltaRSRP-Thresh could be a range of [-X, Y]. We don’t have strong views on the detail value of X and Y, but the deltaRSRP-Thresh can be a large range which can provide more flexibility for implementation. E.g. X and Y can be 30dB |

The sidelink RSRP threshold *SL-Thres-RSRP* has step size of 2 dBm. It is moderator’s view that the step size of *deltaRSRPThresh* is 2 dB.

*Question 3: Do you agree that the step size of deltaRSRP-Thresh is 2 dB?*

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| Company | Answer to Question 3 | Comments |
| OPPO | yes |  |
| DCM | OK |  |
| vivo | OK |  |
| Intel | Agree |  |
| Xiaomi | OK |  |
| Qualcomm | OK |  |
| Samsung | Yes |  |
| Nokia, NSB | Yes |  |
| ZTE,Sanechips | Yes |  |
| NEC | Yes  |  |
| CATT, GOHIGH | Yes | 1dB is also OK.  |

# Conclusion

TBD

# References

1. R1-2207813, LS on missing RRC parameter in IUC Scheme 2, Aug. 2022.